Cloud and Open Source Enterprise Resource Planning Systems

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Abstract— *Enterprise resource planning systems can be extremely expensive for any business to implement and maintain. For small businesses, in-house enterprise systems are often too expensive to even consider, given the high cost of the systems, the installation and configuration process, and the infrastructure to support them. However, open source and cloud-based alternatives are starting to crop up that are bringing enterprise capabilities into the realm of possibility for small to mid-sized businesses. Options range from do-it-yourself in-house solutions to subscription-based services. This paper explores some of the pros and cons of these more affordable enterprise solutions.*

Keywords – Enterprise Resource Planning, Cloud Computing, Open Source

1. Introduction

This is an investigation into affordable opportunities in enterprise resource planning systems (ERP or "enterprise systems"), including an examination of the capabilities of enterprise systems and the potential benefits of using cloud-based resources and/or open source solutions. Whereas large businesses can generally afford enterprise systems, a small to mid-sized business might find them out of reach due to the high cost of purchasing and implementing such systems.

2. Definitions

It is important to set forth the definitions of the terms used in this investigation, including enterprise resource planning systems, open source, and cloud computing. An enterprise resource planning system is a broad-based system designed to integrate software applications from the different functional areas of a business. These systems often serve both internal and external functions. Internal functions in an ERP focus on core activities such as financial management, operations management, and human resource management. External functions involve integrating enterprise systems with those of business partners and suppliers [1]. This integration with external businesses allows information to flow from one company to another in a value system, where each company's value chain is connected to its suppliers' value chains (the "upstream" flows) and/or to its distributors' value chains (the "downstream" flows) [1]. This interconnection is referred to as a value system because value can be added at any point in the flow, and this value can help a company to achieve competitive advantage [1].

Traditional enterprise systems are developed or purchased in modules, where each module applies to a different functional area of the business. For example, one module might be developed to handle inventory management, another might be developed to track customer service activities, and another might be developed for marketing and sales activities. The benefit of this is that a company doesn't have to implement the entire system at one time. It can install and configure the inventory management system first, then add the marketing and sales module, then add the customer service module [2].

Whereas each module of an enterprise system is developed or purchased separately, the advantage of an enterprise system lies in its ability to draw and aggregate data from the modules that serve the separate functional areas. The modules for the different functional areas have various capabilities and features, and yet all data is stored in a centralized data warehouse using consistent data structures. Thus, data from different areas can be combined, queried, and aggregated to produce a clear picture of the entire organization's activities [3].

Even the experts have trouble agreeing on a definition of the term "cloud computing", but a recent

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article in Windows IT Pro summed it up as "an umbrella term for an Internet-based service that provides some type of essential service to the organization" [4]. Cloud services include file storage, application hosting, and even critical services such as database hosting [4].

The term "open source" can be more specifically pinned down, thanks to a non-profit organization called the Open Source Initiative (OSI). The OSI provides a list of ten criteria that software must meet in order to be deemed "open source". Most relevant to this investigation, the software must be freely redistributable, it must include editable source code, and it must allow for "modifications and derived works" [5]. In addition, it must not discriminate "against fields of endeavor", or in other words, it must be available to commercial and non-commercial entities alike [5].

Both open source and cloud-based enterprise systems have the potential to make such systems more affordable and thus, available to a wider array of businesses and organizations. According to ERPwire.com, open source enterprise systems have "done away with the hassles of paying license fees not only during installation, but also whenever a modification is made" [6]. Likewise, ERP.com claims that cloud-based enterprise systems are "easier to use and deploy, thus further reducing the time and cost of meeting specific business needs" [7].

3. Analysis and Discussion

Traditionally, implementing and maintaining an ERP has been a costly undertaking reserved mainly for businesses and corporations with large budgets. In a 1999 article that described issues surrounding ERP implementation, Bingi, Sharma and Godla said that the process often takes more than 3 years. Dow Chemical, for example, expected to spend seven years implementing their ERP system, and Corning was working on implementation of a system that they expected would take five to eight years [2]. Traditional implementation often runs into the millions or even hundreds of millions of dollars [8].

This trend appears to be changing. In a recent blog post describing trends for ERP in 2011, ERP consultant Eric Kimberling predicts a "heavy adoption of Software as a Service [SaaS] models at small and mid-size businesses" [9]. Computer Weekly's Michael Pincher agrees. In May 2010, Pincher said, "given the state of the economy and the fact that traditional big-bang ERP implementations cost more than some organisations can currently afford, SaaS ERP is gaining ground" [10].

Vendors are adapting to this need by providing SaaS ERP systems. For example, Lawson Software uses Amazon's EC2 cloud infrastructure to deliver an enterprise system that is geared toward "mid-sized companies and organisations looking for a more affordable, flexible, and agile deployment option for full-function enterprise software" [11]. Another company called Compiere delivers a cloud-based ERP via Amazon's Web Services [11]. In November 2010, Japan's NEC Corporation announced a partnership with Germany's SAP AG to "launch new ERP cloud service systems" [12]. This new system will merge features from NEC's "core enterprise system into a cloud service system based on SAP ERP", and will include modules for the major areas of business, such as "finance, sales, and procurement" [12].

Open source ERP options have also appeared in recent years. In June 2009, SourceForge.com's top ten open source project list included five ERP projects: PostBooks ERP, OpenBravo ERP, ADempiere ERP Business Suite, OrangeHRM, and webERP [13].

OpenERP is another open source option that includes more than 700 modules, such as "Sales, CRM, Project management, Warehouse management, Manufacturing, Financial management, [and] Human Resources" [14]. By definition, open source systems are distributed for free and are free from licensing fees, so a business could opt to download the system, install it, implement it, and maintain it, all without paying anything to the creators of the software. However, many open source applications are available either via online subscription or with on-site support. In these cases, fees are associated with the services.

OpenERP offers online subscriptions for $39 per user, per month. The cost of on-site support varies, ranging from an annual fee of $1,800 for up to ten users, to over $13,900 for more than 150 users. The on-site service includes help desk services, migration services, bug fixing, security upgrades, and other ongoing services [15].

Another open source project called Apache Open for Business (Apache OFBiz) is "an open source enterprise automation software project licensed under

the MIT Open Source License" [16]. In addition to ERP capabilities, it also includes Supply Chain Management (SCM), Customer Relationship Management (CRM), E-Commerce features, and more [16]. Apache OFBiz is touted as "a foundation and starting point for reliable, secure and scalable enterprise solutions" that can either be used out-of-the-box, or it can be customized to suit individual business needs [17]. Many well known companies are using OFBiz, including 1-800-FLOWERS, DKNY, Discovery Toys, and Isotoner [18].

Both open source and cloud-based ERP systems offer a number of advantages over traditional systems. Some of the advantages of cloud-based systems include the following:

- Increased scalability and performance – the system can grow as the company grows.
- Reduction of capital expenditures – no need to purchase costly servers and infrastructure.
- Distribution of cost through multitenancy – a smaller company might not even need its own server, and thus, can share the use of a server with other small companies.
- Lower barrier to entry – rather than spending millions, a company can start by using a few key modules and purchasing licenses for a few key users [19].

Open source systems are freely distributed, so the system itself can be acquired at no cost to the business or organization that adopts it. In addition, because the source code is available, the business or organization is free to edit the code, add on to it, and customize the system in any way that it sees fit.

The reality is that although open source licensing is free, implementation and maintenance of any ERP takes work and somebody has to do that work. Open ERP, for example, is an open source product, but the company that produces it (also called Open ERP) sells an on-site support package starting at $1,800 per year. A business could certainly opt to perform its own support, but they would need to hire qualified staff to do so. Given that Open ERP already has knowledgeable staff and has already been asked all of the difficult questions, they are likely to be able to provide support at a fraction of the cost it would take to hire somebody in-house due to economies of scale. Also, if a business adopts an open source system and opts to perform data migration on its own, it will have to learn the process from scratch. Open ERP, on the other hand, has likely performed hundreds or thousands of migrations, and as such, they know the best methods and potential pitfalls, and again, can likely perform the migration at a fraction of the cost. For those businesses that opt to go without the support options, they "shouldn't expect to get the same level of support and hand-holding they would receive from commercial software providers" [20]. That is, if they get any support at all.

There are downsides to cloud-based ERP systems as well. According to a recent article in Computer Weekly, it is possible that annual leasing costs can become more expensive than it would have been to install a system locally. Subscription-based cloud systems are also inherently less flexible when it comes to adapting the software to suit unique business needs. And last, systems may not be as easy to implement as the providers purport. Businesses must be prepared to train system users in "new process workflows and transactions" in order to make the most of the new system [10].

4. Conclusion

The barriers to entry for ERP systems have come down in recent years with the advent of cloud-based services and open source systems. In the past, ERP was affordable only to multi-million dollar corporations. Today even many small businesses can afford the annual fees of a cloud-based ERP provider. It could be argued, for example, that nearly any company should be able to afford Open ERP's entry level service at $39 per year per user [15].

Open source systems are also a possibility for smaller businesses, but the total cost of ownership must be considered before implementing such a system. While licensing is free, a locally installed open source ERP would require in-house experts for installation, data migration, maintenance, upgrades, and training. For this reason, small to mid-sized businesses that are considering ERP implementation are likely to be better off with a cloud-based resource, at least initially. Once the business has used the system for a designated period of time, it would be better equipped to determine whether it would be more cost effective to move to an in-house solution.

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